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Time-of-Test DUI Laws vs. BAC Extrapolation

by

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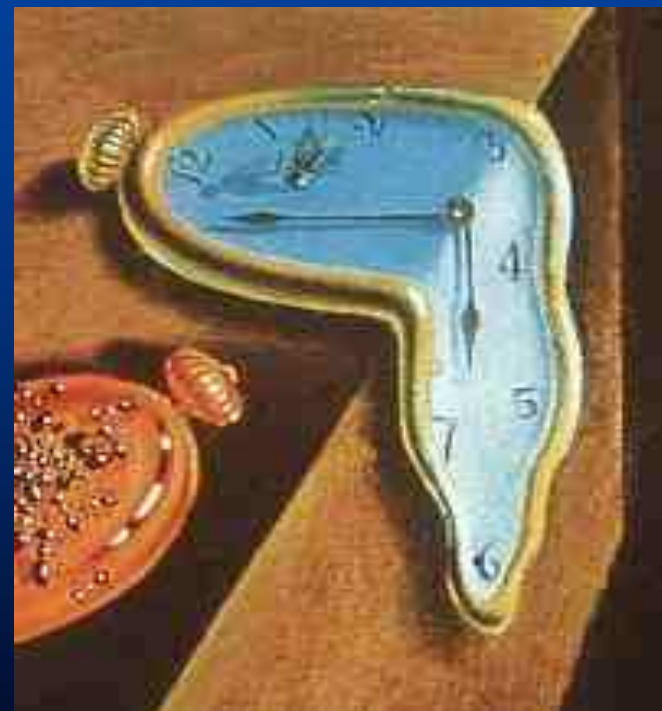
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Salvador Dali, 1931

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

OVERVIEW. Early U.S. DUI laws, including those which incorporated a BAC element of the offense (Indiana, 1939, etc), were Time-of-Offense laws, prohibiting driving a motor vehicle *while* intoxicated by or under the influence of alcohol. That was also true for early “per-se” DUI laws defining the offense in terms of an alcohol concentration threshold. Prosecutions under such laws, therefore, required inferential proof of the existence of alcoholic intoxication or influence, or a prohibited alcohol concentration in blood or other body fluids at the time of motor vehicle operation. Most commonly, a rebuttable presumption to that effect was established by circumstantial evidence concerning the driving, the driver’s appearance, behavior and physical status, alcoholic beverage intake, some agility or performance tests by the driver, etc.

Chemical test evidence of blood or breath-alcohol concentrations in specimens collected after the offense was typically used to corroborate the testimony of officers and witnesses.

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

OVERVIEW, continued.

Extrapolation (i.e., back-calculation) of post-offense blood, breath, or urine alcohol concentrations to the time of the alleged offense were offered on some occasions though expert testimony by prosecution witnesses, and occasionally in rebuttal by expert witnesses for the defense. Because of the complexities of the various factual situations involved and of the extrapolation process itself, court decisions at the appellate level have yielded divided opinions and practices: Some state high courts allowed extrapolation in traffic law offense violations, some prohibited extrapolation, some required it. No U.S. Supreme Court decision has been found on that specific issue. Likewise, the opinions of the relevant scientific community on extrapolation are distinctly bifurcated for and against the practice.



TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

OVERVIEW, continued. Quoting the Alcohol Technology, Pharmacology and Toxicology Subcommittee of the National Safety Council's Committee on Alcohol and Other Drugs:

“The time course of alcohol in the human body is a dynamic process. Retrograde extrapolation has been used to link the alcohol concentration at the time of the test back to the time of the offense. Retrograde extrapolation is a scientific calculation of a subject's alcohol concentration at a prior time, usually the time of the offense, derived from a blood, breath, or urine alcohol concentration measured at a later time. To be forensically useful and scientifically valid, such extrapolations may require facts concerning the person, that person's alcohol consumption, and related information, that are often not available in such situations.”

[Report of the NSC/CAOD Subcommittee on Alcohol Technology, Pharmacology, and Toxicology. New Orleans, LA, 21 Feb 2005.]

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

OVERVIEW, continued. To address these issues in the present day context of public safety, traffic situations, and legal status, many jurisdictions have adopted laws that define the alcohol element of the traffic offense as the alcohol concentration in the blood, breath or other biological specimen existing at the time of the test – “Time-of-Test” laws. As of Feb. 2005, at least 32 states + D.C. and all of Canada had adopted such time-of-test laws. Appellate courts have uniformly upheld the constitutionality and legal validity of such laws.

Conclusion

“It is the opinion of this Subcommittee that time-of-test laws are scientifically sound and supported by the scientific literature.”

[Report of the NSC/CAOD Alcohol Technology, Pharmacology, and Toxicology Subcommittee. New Orleans, LA, 21 Feb 2005. (54 references).]

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

LEGAL ASPECTS

- Time-of-Test laws define the alcohol element(s) of the DUI offense in terms of a bodily substance alcohol concentration measured within a stated time interval after the time of driving or the arrest. The several jurisdictions differ chiefly with respect to
 - Time-of-test element: Per se time limit; presumption – no time limit; presumption - time limit
 - Time limits: 2 hours, 3 hours, 4 hours; “reasonable time,” “any relevant time” after the offense or arrest.
- The per se prima facie or presumption provisions can be rebutted by defendant(s) (and often are).
- In most states with a time-of-test limit, tests performed beyond the stated time interval remain admissible under normal evidence rules, but lose the benefit of the presumption.

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

LEGAL ASPECTS, continued

Examples of Time-of-Test laws are the NCUTLO Uniform Vehicle Code DUI Model Law, the Criminal Code of Canada, and the Oklahoma Law.

NCUTLO DUI MODEL LAW

Section 101. This act shall be known as the **Millenium DUI Prevention Act**

Section 102. Driving under the influence of alcohol or drugs; under the extreme influence of alcohol

a) A person shall not drive any vehicle while:

1. the alcohol concentration in such person's blood or breath is 0.08 or more;
2. the alcohol concentration in such person's blood or breath as measured within (two) hours of the time of driving is 0.08 or more;
3. under the influence of alcohol;

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

LEGAL ASPECTS, continued

NCUTLO DUI MODEL LAW, continued

Section 102. continued

4. under the influence of any drug or combination of drugs to a degree which renders such person incapable of safely driving; or
5. under the combined influence of alcohol and any drug or drugs to a degree that renders such person incapable of safely driving.

b) Under the Extreme Influence of Alcohol. A person shall not drive any vehicle while

1. the alcohol concentration in such person's blood or breath is (0.16) or more; or,
2. The alcohol concentration in such person's blood or breath as measured within (two) hours of the time of driving is (0.16) or more...

[Source: <http://www.ncutlo.org/1999chvi.htm> retrieved on 10/28/06.]

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

LEGAL ASPECTS, continued

Criminal Code of Canada, section: 258 (1) (c)



- c) Where samples of the breath of the accused have been taken pursuant to a demand made under subsection 254(3), if
 - ii. each sample was taken as soon as practicable after the time when the offence was alleged to have been committed and, in the case of the first sample, not later than two hours after that time, with an interval of at least fifteen minutes between the times when the samples were taken,...

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

LEGAL ASPECTS, continued

Criminal Code of Canada, section 258 (1) (c), continued

- iv. ...evidence of the results of the analysis so made is, in the absence of evidence to the contrary, proof that the concentration of alcohol in the blood of the accused at the time when the offence was alleged to have been committed was, where the results of the analyses are the same, the concentration determined by the analyses and, where the results of the analyses are different, the lowest of the concentrations determined by the analyses;...

(comparable provision for blood samples)

[**Source:** <http://laws.justice.gc.ca/en/c-46/280731.html> retrieved on 10/28/06.]

[**Comment:** Note the provision for rebuttal – “in the absence of evidence to the contrary.”]

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

LEGAL ASPECTS, continued

OKLAHOMA STATUTES, TITLE 47 (2006)

§ 756. Admission of Evidence Shown by Tests.

A...For the purpose of this title, when the person is under the age of twenty-one (21) years, evidence that there was, **at the time of the test**, any measurable quantity of alcohol is prima facie evidence that the person is under the influence of alcohol in violation of Section 11-906.4 of this title. For persons twenty-one years of age or older:

1. Evidence that there was, **at the time of the test**, an alcohol concentration of five-hundredths (0.05) or less is prima facie evidence that the person was not under the influence of alcohol;
2. Evidence that there was, **at the time of the test**, an alcohol concentration in excess of five-hundredths (0.05) but less than eight-hundredths (0.08) is relevant evidence that the person's ability to operate a motor vehicle was impaired by alcohol...

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

LEGAL ASPECTS, continued

OKLAHOMA STATUTES, TITLE 47 (2006), continued

§ 756. Admission of Evidence Shown by Tests, continued

3. Evidence that there was, **at the time of the test**, an alcohol concentration of eight-hundredths (0.08) or more shall be admitted as prima facie evidence that the person was under the influence of alcohol.
- B. For purposes of this title, “alcohol concentration” means grams of alcohol per one hundred (100) milliliters of blood if the blood was tested, or grams of alcohol per two hundred ten (210) liters of breath if the breath was tested.
- C. To be admissible in a proceeding, the evidence must first be qualified by establishing that the test was administered to the person within two (2) hours after the arrest of the person.

[Source: http://www2.lsb.state.ok.us/os/os_47_756.rtf retrieved on 10/28/06.]

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

LEGAL ASPECTS, continued

Equally important to scientific aspects in assessing the appropriateness and validity of attempted extrapolations is the applicable legal standard of proof in the instant situation: 1) Beyond reasonable doubt, 2) clear and convincing evidence, or 3) preponderance of the evidence (more probable than not). The standard of proof employed by the extrapolator should always be stated as part of the extrapolation report.

In general, extrapolation in legal proceedings, if undertaken at all, should be based either on a suitably complete and extensive hypothetical question, or on a series of known facts and/or justifiable assumptions which are fully disclosed and itemized by the expert witness performing the extrapolation.

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

LEGAL ASPECTS, continued

The Rationality Test controls such legal presumptions as the time-of-offense alcohol status of a DUI defendant derived from indirect or circumstantial evidence of that defendant's blood or breath-alcohol concentration at some later time. The

U.S. Supreme Court set down a rule stating that for a presumption to be constitutionally valid there must be a "rational connection between the fact proved and the ultimate fact presumed." [*Tot v. United States*, 319 U.S. 463 (1943).]

That High Court standard is often impossible to achieve in criminal trials of DUI offenses, given the limited existence and accessibility of the required information to the needed extent, and the applicable standard of proof.

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

BAC/BrAC EXTRAPOLATION: LEGAL ASPECTS, continued

There is a large and very diverse body of appellate and state High Court decisions on the subject of BAC extrapolation in criminal trials, traffic law offense prosecutions, and civil litigation. The majority of these court decisions support the admissibility of DUI extrapolations, sometimes with stipulated restrictions or conditions. The relevant legal literature is too large and complex to cite or consider herein. However, one recent Texas High Court case is so compelling and relevant to this topic that it demands consideration and study. That leading case concerning the admission of expert testimony on retrograde BAC extrapolation is ***Mata v. The State of Texas*** [46 S.W.3d 902 Texas Crim. App. 2001].

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

BAC/BrAC EXTRAPOLATION: LEGAL ASPECTS, continued

The *Mata* court held that the trial court erred in admitting retrograde BAC extrapolation testimony in the DUI prosecution because the State failed to prove by clear and convincing evidence that the expert witness testimony was reliable. The *Mata* court however, also, held that DUI retrograde extrapolation testimony can be reliable if certain factors are known. Among other important findings, the opinion contains the following excerpted Court conclusions:

“We believe that the science of retrograde extrapolation can be reliable in a given case. The expert’s ability to apply the science and explain it with clarity to the court is a paramount consideration. In addition, the expert must demonstrate some understanding of the difficulties associated with a retrograde extrapolation. He must demonstrate an awareness of the subtleties of the science and the risks inherent in any extrapolation. Finally, he must be able to clearly and consistently apply the science.

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

BAC/BrAC EXTRAPOLATION: LEGAL ASPECTS, continued

The court evaluating the reliability of a retrograde extrapolation should also consider (a) the length of time between the offense and the test(s) administered; (b) the number of tests given and the length of time between each test; and (c) whether, and if so, to what extent, any individual characteristics of the defendant were known to the expert in providing his extrapolation. These characteristics and behaviors might include, but are not limited to, the person's weight and gender, the person's typical drinking pattern and tolerance for alcohol, how much the person had to drink on the day or night in question, what the person drank, the duration of the drinking spree, the time of the last drink, and how much and what the person had to eat either before, during, or after the drinking.

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

BAC/BrAC EXTRAPOLATION: LEGAL ASPECTS, continued

Obviously, not every single personal fact about the defendant must be known to the expert in order to produce an extrapolation with the appropriate level of reliability. As the Kentucky Supreme Court has recognized, if this were the case, no valid extrapolation could ever occur without the defendant's cooperation, since a number of facts known only to the defendant are essential to the process. If the State had more than one test, each test a reasonable length of time apart, and the first test were conducted within a reasonable time from the time of the offense, then an expert could potentially create a reliable estimate of the defendant's BAC with limited knowledge of personal characteristics and behaviors. In contrast, a single test conducted some time after the offense could result in a reliable extrapolation only if the expert had knowledge of many personal characteristics and behaviors of the defendant. Somewhere in the middle might fall a case in which there was a single test a reasonable length of time from the driving, and two or three personal characteristics of the defendant were known to the expert. We cannot and should not determine today the exact blueprint for reliability in every case. Suffice it to say that the factors must be balanced."

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

BAC/BrAC EXTRAPOLATION: SCIENTIFIC ASPECTS

Extrapolation of a blood or breath-alcohol concentration from the time of one or more BAC or BrAC measurements to another time is a computational process based on known and/or assumed facts, alcoholic pharmacokinetics parameters, and mathematical modeling. Extrapolation can be performed in a backward manner (***Retrograde Extrapolation***) to a relevant time prior to that of the alcohol measurement(s), or in a forward manner (***Anterograde Extrapolation***) to a relevant time subsequent to that of the alcohol measurement(s). Currently, several commercial computer programs are available, some online on the Internet, to assist in performing the relevant calculations, using program default pharmacokinetic values or other known individual or population-based parameters for such factors as body mass, Volume of Distribution, alcohol absorption time, alcohol clearance rates, plus volume and alcohol content and timing and duration of alcoholic beverage consumption, effects of meals, etc.

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

BAC/BrAC EXTRAPOLATION: SCIENTIFIC ASPECTS, continued

The process is one of mathematical modeling. It is usually reported in the form of estimates of blood (or breath) alcohol concentrations ranges (with associated probability expressions) at a relevant time or times, with corresponding graphical representation of BAC or BrAC versus time. In other than specialized research settings, BAC or BrAC extrapolations always require a series of assumptions which should be expressly stated and quantitated. An example is the assumed mathematical model of the post-absorptive post-peak course of blood-alcohol decrease over time, with respect to both the nature (e.g., linear zero order process, or exponential first order process, etc.) and the rate of ethanol concentration decrease per time unit (e.g., g/dL/hr).

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

BAC/BrAC EXTRAPOLATION: SCIENTIFIC ASPECTS, continued

A particularly unacceptable form of BAC extrapolation is ***Speculative Retrograde Extrapolation***. It is simply the wholly-speculative process – unsupported by measured and known particulars – of adding to a post-event alcohol test result the product of a time interval (in hours) and an assumed linear blood-alcohol elimination rate of 0.015 g/dL/hr, or another assumed rate.

Example: Measured BAC = 0.08 g/dL; time interval in issue = 4 hours.
Extrapolated BAC = $0.08 + (4 \times 0.015) = 0.08 + 0.06 \longrightarrow \underline{\mathbf{0.14\ g/dL}}$.

Of course, the longer the time lapse, the greater can be the deviation of the speculative result from the true BAC value. Further, blood-alcohol decrease rates vary in the population by a factor of at least seven-fold. Any given assumed single rate may not be applicable at all.

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

BAC/BrAC EXTRAPOLATION:SCIENTIFIC ASPECTS, continued

There are relatively few current and reasonably inclusive treatments of alcohol extrapolation in the scientific literature, and much biased discussion exists in the extensive DUI-defense literature. One pertinent scientific reference is:

“Empirical Blood Alcohol Estimation,” in ALCOHOL AND DRUG INTOXICATION by R. A. Rockerbie, Second edition. Victoria, BC, Canada. AlcoTrace Publications, 2001, pp. 156-179.

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

DUBOWSKI PERSPECTIVE

The Dubowski position on BAC extrapolation has occasionally been misunderstood and/or misrepresented. It is, and has always been:

In my opinion, extrapolation of a blood or breath-alcohol concentration from one or more known BAC or BrAC measurement value at established times to another relevant time can be performed with scientific validity and forensic acceptability, to a stated degree of probability, by a person who is properly qualified by education, experience, expertise, and competence, if sufficient relevant and material information concerning the subject and the events in issue exists and is available. Whether these conditions are satisfied in a given instance is a question of fact, which cannot be generalized.

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

DUBOWSKI PERSPECTIVE, continued

The initial enactment of Time-of-Offense DUI and DWI laws more than 60 years ago led to proliferation in the use of BAC extrapolation in order to link the results of post-arrest chemical tests of blood, breath, or urine to time of the alleged offense, as required to prosecute such traffic law offenses. There are recognized scientific limitations of the BAC extrapolation process – especially in the common situation of nonexistent or unavailable key information concerning the defendant, the defendant's alcohol consumption, and related matters – as well as legal obstacles to the use of extrapolation in criminal prosecutions (where the standard of proof typically is “beyond reasonable doubt”).

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

DUBOWSKI PERSPECTIVE, continued

Time-of-Test DUI laws, including absolute BAC-offense or “per se” laws, have been adopted by the majority of jurisdictions to overcome the foregoing limitations of time-of-offense laws and the need for BAC extrapolation in prosecuting offenses thereunder. An important impetus for adopting Time-of-Tests DUI laws is the fact that both appellate courts and the relevant scientific community are deeply divided on the issue of scientific validity and legal acceptability of BAC extrapolation.

As an aside, many of the limitations or potential defects of BAC extrapolation which attach to that process when used in criminal law prosecutions are absent or can be overcome when BAC extrapolation is carried out in civil litigation, e.g., in dram shop, wrongful death, or similar cases where the legal standard of proof is the preponderance of the evidence and full pre-trial discovery is available.

TIME-OF-TEST DUI LAWS VS. BAC EXTRAPOLATION

DUBOWSKI PERSPECTIVE, continued

I join in and support the position of the NSC/CAOD Subcommittee on Alcohol Technology, Pharmacology, and Toxicology, which advocates adoption of Time-of-Test DUI laws and found them to be scientifically sound and supported by the scientific literature. The vast majority of relevant appellate and State High Court opinions also support the constitutionality and legal validity of Time-of-Test DUI statutes.

The *Mata* case (Texas Court of Criminal Appeals, 2001) demonstrates that courts can, and on occasion do, adequately clarify whether and under what conditions expert testimony concerning DUI extrapolation can be admissible in the prosecution of alcohol-related traffic offenses. It should be considered as a guideline on that topic by those contemplating offering or giving such testimony, pending a U.S. Supreme Court decision on this matter.